
International Standard



8481

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Data communication — DTE to DTE physical connection using X.24 interchange circuits with DTE provided timing

Communication de données — Connexion physique d'ETTD vers ETTD utilisant les circuits de jonction X.24 avec une base de temps fournie par l'ETTD

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8481 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Data communication — DTE to DTE physical connection using X.24 interchange circuits with DTE provided timing

0 Introduction

This International Standard deals with the interconnection of Data Terminal Equipment (DTE) without any signal conversion, whereby a DTE is not attached to a Data Circuit-terminating Equipment (DCE), this being part of a telecommunication facility.

The desired DTE to DTE direct connection may be totally located at the user's territory. The aim being to relate these interconnections to the elements of the CCITT recommended/ISO standardized DTE/DCE interfaces, in order to avoid equipment proliferation.

1 Scope and field of application

This International Standard describes an arrangement for interconnection of Data Terminal Equipment (DTE), without intermediate Data Circuit-terminating Equipment (DCE), in terms of electrical, mechanical, and functional characteristics. This International Standard applies to DTEs with interface circuits standardized in CCITT Recommendation X.24 for transmission over public data networks. The interconnections are restricted to point-to-point connections.

NOTE — The extension to multipoint configurations is at present under study.

This International Standard applies to DTEs which employ the balanced electrical characteristics of CCITT Recommendation V.11 (X.27) for data signalling rates up to 10 Mbits/s.

The interconnection may be used for start-stop or synchronous transmission. For synchronous transmission, signal element timing shall be interconnected by circuit X — DTE transmit signal element timing and circuit S — Signal element timing (see clause 5).

2 References

ISO 4903, *Data communication — 15-pole DTE/DCE interface connector and contact number assignments.*

CCITT Recommendation V.11 (or X.27), *Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications.*

CCITT Recommendation X.24, *List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) on public data networks.*

3 Interconnection configuration

Only one type of DTE to DTE interconnection configuration is considered for point-to-point connections with interfaces according to CCITT Recommendation X.24; this being shown in figure 1.

There are two lines of demarcation between the two interconnecting DTEs, one located at each DTE connector. The adaptor and any cable linking these two DTE connectors are not part of either DTE.

Intermediate balanced pair cable may be provided with a maximum length mainly dependent on the parameters of the electrical characteristics of the interchange circuits and the data signalling rate.

4 Interchange circuit requirements

The interchange circuit requirements are specified in terms of electrical, functional, mechanical and interchange point cross-over characteristics.

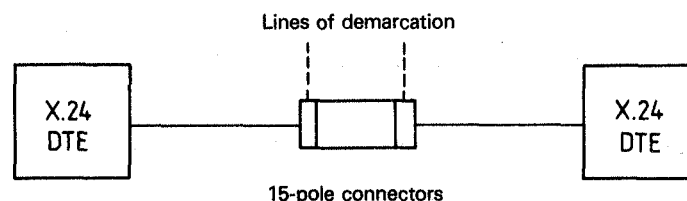


Figure 1 — DTE interconnection configuration

4.1 Electrical characteristics

The electrical characteristics of CCITT Recommendation V.11 are mandatory.

Appendix 1 of Recommendation V.11 gives guidance on the operational constraints imposed by the length, balance, and terminating resistance of the interconnecting cable in relation to the data signalling rate. With additional considerations, longer distances may be possible.

4.2 Functional characteristics

The functional characteristics of interchange circuits conform to CCITT Recommendation X.24 for each interface of an interconnecting DTE. The interchange circuits required are listed in the table.

Table — List of X.24 circuits for DTE interconnection

X.24 circuit designation	Inter-change points V.11	ISO 4903 contact number	Circuit description/ remarks
—	—	1	Cable shield ¹⁾
G	C — C'	8	Signal ground (see 4.5)
T	A — A' B — B'	2 9	Transmit
R	A — A' B — B'	4 11	Receive
S	A — A' B — B'	6 13	Signal element timing (from DCE)
X	A — A' B — B'	7 14	DTE transmit signal element timing

1) Contact 1 is for connecting the shields between tandem sections of shielded interface cable.

4.3 Mechanical characteristics

The mechanical characteristics of the interface conform to ISO 4903. Both DTEs provide the 15-pole connector, while the cross-over arrangement specified in 4.4, including any

associated cable, with the mating connector conforming to the DCE connector as described in ISO 4903, is furnished by the installation authority.

The cross-over arrangement will therefore also be an adaptor between 15-pole connectors.

4.4 Interchange point cross-over characteristics

Figure 2 shows the basic cross-over arrangement in accordance with the interconnecting configuration shown in figure 1. For synchronous transmission, the signal element timing is not included in figure 2, but is described in clause 5.

4.5 Earthing

Depending on local safety requirements and for electromagnetic compatibility (EMC) considerations it may be required to connect circuit G (Signal Ground) to the protective earth in each DTE.

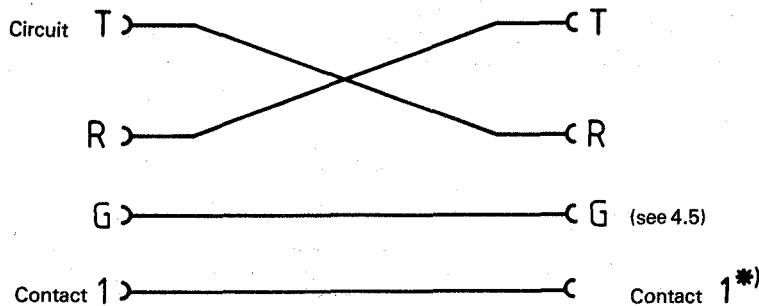
If the DTEs are connected to different primary power supplies with different earthing systems, significant potential differences may arise between the signal ground terminals of interconnected DTEs. If these voltages are higher than the common mode acceptance specified in the electrical characteristics of the interchange circuit, transmission errors and even damage to the circuitry may result.

If circuit G is completed between the DTEs it may reduce this potential difference but excessive circulating currents may result.

NOTE — In practice, different signal ground arrangements may need to be considered for a particular situation.

5 Timing provision

For synchronous transmission, signal element timing shall be interconnected by circuit X — DTE transmit signal element timing. It interconnects to circuit S — Signal element timing, which serves for the receive direction only.



* Contact 1 is for connecting the shields between tandem sections of shielded interface cable.

Figure 2 — Basic circuit cross-over arrangement

Normally DTEs using X.24 interchange circuits obtain signal element timing information from the DCE. Therefore, these DTEs will require an additional DTE-source signal element timing circuit X. It is assigned to share the same connector contact as circuit B and F in ISO 4903. Since the direction of transmission of circuit X is opposite to that of circuits B and F, a logical switch or physical option in the DTE may be necessary if the DTE intends to apply more than one of these circuits for alternative applications.

The timing arrangement for connecting two X-series DTEs is illustrated in figure 3 and described below.

The additional DTE signal element timing circuit is provided by each DTE. The cross-over of these timing circuits (see figure 3) shall be added to the basic cross-over arrangement in figure 2.

This arrangement, unlike other arrangements, does not cause skewing between data and timing circuits.

6 Use of control procedures

This International Standard assumes no restrictions on the use of any data link control procedure or any higher level data transfer protocol.

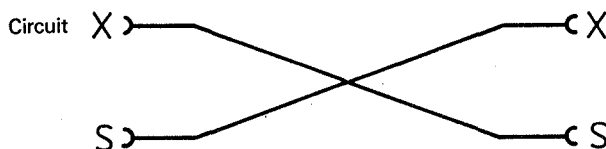


Figure 3 Signal element timing configuration
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